Information Systems Program Highlights

Major accomplishments achieved by NASA's Information Systems are highlighted below. They cover reported work performed from November, 1996, through February, 1997, and reflect the combined efforts of many people.

Ames Research Center (ARC)

NASA Research and Education (NREN)—Christine Falsetti

- Established cost model with NASA Integrated Services Network for bandwidth sharing of asynchronous transport mode (ATM) layer 2 services network using the OC-3c five-site NREN infrastructure.

- Provided DARWIN with ATM DS-3 service costing to Boeing and McDonnell-Douglas locations. Provided Desktop Video group for Kennedy Space Center ATM service (OC-3c and DS-3).

- Developed and participated in interagency Large Scale Networking Workshop on Next Generation Internet (NGI). Examined agency missions, goals, and existing five year plans to determine which planned agency projects have the most relevance to the NGI. Developed an intergrated, interagency action plan framework that indentifies agency directions and opportunities, leverages current agency investments through partnerships, and maximizes agency projects without duplication.

- Attended Internet Protocol Multicast Summit. Presented paper on ARC's successful multicast experience in the Space Bridge to Russia telemedicine project.

- Completed NASA NREN Level II draft plan for FY97 to FY2002. Outlined NASA-wide area networking research and development program incorporating the current NREN work and the future NGI Internet Initiative. Plan sent for peer review wtihin agency.

- Developed High performance networking application selection critieria for testing and demonstrations across the NREN. Established and initiated application solicitation process.

Information provided by Pat Kaspar, Contributing Editor, ARC.

Goddard Space Flight Center (GSFC)

Science Computing Branch—Nancy Palm NASA Center for Computational Sciences (NCCS)

- The IBM 3494 robotic tape subsystem with eight 3590 IBM "Magstar" tape drives was put into production in the NCCS and

integrated with the Convex/UniTree mass storage system. This equipment adds over 24 TB of uncompressed capacity to the Convex/UniTree system, bringing the system to 48.8 TB of on-line storage capacity.

- The NCCS added QSC disks to UniTree, increasing UniTree disk cache size from 155 GB to 375 GB and allowing file copies to stay on disk 2.4 times longer.

- The Technical Assistance Group established guaranteed 24 hour response Monday through Friday for NCCS user support for Crays, UniTree, and T3D. Improved the user interface for the NCCS documentation World Wide Web (WWW) page to further enhance user support <http://esdcd.gsfc.nasa.gov/NCCS/Userinfo.html>.

- The Cray systems support staff made extensive preparations to upgrade the J90 cluster operating system to Unicos 9.0 for the installation of the Cray J90 SE processors, which are expected to yield performance boosts of 50 percent more in the scalar processing area.

- Linked the Science Computing Branch new WWW home page at <http://sdcd.gsfc.nasa.gov/SCB/> from the newly redesigned Earth and Space Data Computing Division WWW site at <http://esdcd.gsfc.nasa.gov/>.

High Performance Computing and Communications (HPCC) Earth and Space Science (ESS) Project—Jim Fischer

- Began work with nine Investigator Institutions and testbed vendor, Cray Research Inc., under a Cooperative Agreement Notice issued in 1995. In October, Cray Research Inc. installed a 512-processor T3D system at GSFC for Investigator team use. ESS held the first Science Team meeting of "Round-2" Investigators in conjunction with Supercomputing '96. By the end of January most teams had achieved 10 gigaflops sustained performance on key science codes using the T3D, in many cases enabled by code restructuring and optimization by expert Cray personnel.

- The Beowulf Parallel Linux by the Center of Excellence for Space Data and Information Systems at GSFC has achieved superior price/performance for scientific computing by using low-cost, mass-market components. Beowulf systems from Los Alamos National Lab and Caltech were joined into a 32-processor Beowulf (worth around $100K) at Supercomputing '96, where Mike Warren of Los Alamos National Lab and John Salmon of Caltech rantree code problems achieving twice the performance (around 2.2 Gigaflops) that was achieved on the 16-processor system. The article "Do-It-Yourself Supercomputers," *Science*, December 13, describes Beowulf and its breakthroughs. breakthroughs.

- The National HPCC Software Exchange (NHSE) released the Parallel Tools Library repository, High Performance Computing-Netlib (a high performance branch of the Netlib software) repository, and the Chemistry Software and Information Services repository <http://www.nhse.org/>. The beta release of the Repository in a BoxToolkit is also available.

- Sponsored Frontiers'96, the Sixth Symposium on the Frontiers of Massively Parallel Computation, held in Annapolis, Maryland, in October. Noteworthy were presentations by all eight NSF Petaflop/s point design study teams and a ceremony officially handing over NASA's original Massively Parallel Processor to the Smithsonian Institution. Professor Charles Weems (University of Massachusetts—Amherst) and Bill Carlson (Center for Computing

Science) will serve as chair and vice chair respectively for the Frontiers '98 Symposium.

- Released the final report (combined) for the Petaflop/s Architecture Workshop '96 and Petaflop/s System Software (PetaSoft '96), edited by Tom Sterling of Jet Propulsion Laboratory/ Caltech. This work in the newly emerging interdisciplinary science of Petaflop/s, involves technical contributions of close to a hundred experts from a broad range of fields. Held the second Petaflops Frontier (TPF-2) workshop at the Frontiers '96 symposium. TPF is the only forum directly related to Petaflop/s computing that is open to the general community.

- The FY96 Annual Report of the HPCC/ESS Project is now available on the WWW <http://sdcd.gsfc.nasa.gov/ESS/annual.reports/ess96contents/ess96.html>.

Science Communications Technology Branch—Jerome Bennett

- Through network upgrades and extensions, GSFC's HPCC/ESS Network Team enabled the National Library of Medicine (NLM) to use Advanced Communication Technology Satellite at 155 Mbps from its High Data Rate Terminal at GSFC over the ATM-based Advanced Technology Demonstration Network. This experiment is expected to maximize network user access to NLM's 80-Gbyte Visible Human data sets.

- Assisted in developing a new Oracle-based data storage/retrieval system for the Global Legal Information System (GLIN) Project for demonstration to Congressional representativees Submitted proposal to EU's Minority University Research and Education Program to develop user interfaces, modeling, and effective retrieval for GLIN.

- GSFC's HPCC/ESS Network Team enabled NASA's first 622 Mbps (OC-12c) ATM wide-area network use Nov. 1996, providing OC-12c links among ATDNet, ACTS's High Data Rate Terminal, and GSFC's first OC-12c-attached high performance computer.

- Conducted performance tests of GSFC's first Sun UltraSPARC with an OC-12c/622 Mbps ATM Network Interface Card (NIC) . In nttcp memory-to-memory tests with a SUN SPARCstation 20/60 with an OC-3/155 Mbps NIC, approximately 105 Mbps was achieved over GSFC ATM local area network (LAN). By comparison, approx-imately 85 Mbps was achieved between a pair of SUN SPARCstation 20/60's with OC-3/155 Mbps NIC's on the same ATM LAN.

- Achieved new best performance of over 100 Mbps end-to-end in nttcp memory-to-memory tests over the upgraded ATM-based ATDNet between a SUNSPARCstation 20/60 at GSFC and a SGI at NRL. By comparison, our previous best between GSFC and th e Naval Research Laboratory was approximately 85 Mbps end-to-end.

Applied Information Services Branch—William Campbell

- GSFC Director, Rothenberg, and Francis. Lawrence, president of Rutgers University, signed a Memo Of Understanding establishing Rutgers University (New Jersey campuses), Columbia University, and Hackensack Meadowland Development Commission as a Regional Validation Center (RVC). RVC's at University of Maryland--Baltimore County and the University of Souther Lousianna are operational. RVC's enable university and institutional access to regional data from satellites, as part of an effort to transfer NASA technology to the outside community.

- Steve Maher (visualization personnel) received $70K Director's Discretionary Funding (DDF) for a"Three Dimensional Display for Earth Science Data" that will utilize next-generation technology to display real-time GSFC Earth science data in a truly 3D space. Scientific Visualization Studio Manager, Horace Mitchell, received $40K DDF funding for "Hologlobe Near-Real Time Data Display," a project to link the Smithsonian's Hologlobe exhibit to Mission To Planet Earth data archives.

- Pat Coronado successfully ran a one month SeaWiFS Ground System operational test in December. All systems operated in autonomous mode acquiring all National Oceanic Atmospheric Administration 14 and 12 data from each pass. In total, 347 passes were tracked (approx 90 Mbytes per pass) and data were acquired from 341 passes-a 100 percent tracking and 98 percent acquisition for December.

- The Scientific Visualization Studio's established a new on-line video catalog at <http://esdcd.gsfc.nasa.gov/SVS/svscat/catalog.html>.

Information provided by Judy Laue, Contributing Editor, GSFC.